FORM PTO-1390
REV. 5-93

US DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEYS DOCKET NUMBER
P99,0499

U.S.APPLICATION NO. (if known, see 37 CFR 1.5)
09/308303

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/DE97/02582	**06 November 1997**	18 November 1996

TITLE OF INVENTION
METHOD AND SYSTEM FOR CONFIGURING A RADIO INTERFACE IN A COMMUNICATION SYSTEM

APPLICANT(S) FOR DO/EO/US
Christian Menzel et al.

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay.
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of International Application as filed (35 U.S.C. 371(c)(2))
   a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☐ has been transmitted by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US)
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. §371(c)(3))
   a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☐ have been transmitted by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☒ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☒ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern other document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 C.F.R. 1.97 and 1.98; (PTO 1449, Prior Art, Search Report)
12. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 C.F.R. 3.28 and 3.31 is included. (See attached envelope)
13. ☒ A FIRST preliminary amendment.
    ☐ A SECOND or SUBSEQUENT preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☒ Other items or information:
    a. ☒ Submission of Drawings - Figs. 1-5 on five sheets
    b. ☒ EXPRESS MAIL #EL188954682US dated 5-17-99

U.S.APPLICATION NO. (If known, see 37 C.F.R. 1.5)	INTERNATIONAL APPLICATION NO. PCT/DE97/02582	ATTORNEY'S DOCKET NUMBER P99,0499

17. ☒ The following fees are submitted:

	CALCULATIONS	PTO USE ONLY
BASIC NATIONAL FEE (37 C.F.R. 1.492(a)(1)-(5): Search Report has been prepared by the EPO or JPO $840.00		
International preliminary examination fee paid to USPTO (37 C.F.R. 1.482) . . $720.00		
No international preliminary examination fee paid to USPTO (37 C.F.R. 1.482) but international search fee paid to USPTO (37 C.F.R. 1.445(a)(2) $790.00		
Neither international preliminary examination fee (37 C.F.R. 1.482) nor international search fee (37 C.F.R. 1.445(a)(2) paid to USPTO $1070.00		
International preliminary examination fee paid to USPTO (37 C.F.R. 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4) . . . . . $ 98.00		
ENTER APPROPRIATE BASIC FEE AMOUNT =	$ 840.00	
Surcharge of $130.00 for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 C.F.R. 1.492(e)).	$	

Claims	Number Filed		Number Extra	Rate		
Total Claims	17	- 20 =	0	X $ 18.00	$	
Independent Claims	2	- 3 =	0	X $ 78.00	$	
Multiple Dependent Claims				$260.00 +	$	
				TOTAL OF ABOVE CALCULATIONS =	$ 840.00	
Reduction by ½ for filing by small entity, if applicable. Verified Small Entity statement must also be filed. (Note 37 C.F.R. 1.9, 1.27, 1.28)					$	
				SUBTOTAL =	$ 840.00	
Processing fee of $130.00 for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(f)). +					$	
				TOTAL NATIONAL FEE =	$ 840.00	
Fee for recording the enclosed assignment (37 C.F.R. 1.21(h). The assignment must be accompanied by an appropriate cover sheet (37 C.F.R. 3.28, 3.31). $40.00 per property +						
				TOTAL FEES ENCLOSED =	$ 840.00	
				Amount to be refunded	$	
				charged	$	

a. ☒ A check in the amount of $ 840.00 to cover the above fees is enclosed.

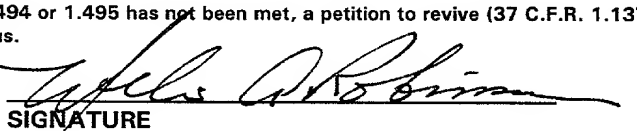
b. ☐ Please charge my Deposit Account No. _____ in the amount of $ _____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. **08-2290**. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 C.F.R. 1.494 or 1.495 has not been met, a petition to revive (37 C.F.R. 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

Hill & Simpson
A Professional Corporation
85th Floor Sears Tower
Chicago, Illinois 60606



SIGNATURE

Melvin A. Robinson
NAME

31,870
Registration Number

BOX PCT

IN THE UNITED STATES ELECTED OFFICE

OF THE UNITED STATES PATENT AND TRADEMARK OFFICE

UNDER THE PATENT COOPERATION TREATY-CHAPTER II

PRELIMINARY AMENDMENT

APPLICANTS: Christian Menzel et al. DOCKET NO: P99,0499

SERIAL NO: GROUP ART UNIT:

EXAMINER:

INTERNATIONAL APPLICATION NO: PCT/DE97/02582

INTERNATIONAL FILING DATE: 06 November 1997

INVENTION: **METHOD AND SYSTEM FOR CONFIGURING A RADIO INTERFACE IN A COMMUNICATION SYSTEM**

Assistant Commissioner for Patents,
Washington, D.C. 20231

Sir:

Please amend the above-identified International Application before entry into the National stage before the U.S. Patent and Trademark Office under 35 U.S.C. §371 as follows:

In The Specification:

On pages 1-22, at the top of each page, cancel "GR 97 P 2855".

On amended sheet 1, cancel lines 1-5, and substitute the following therefor:

--S P E C I F I C A T I O N

TITLE

METHOD AND SYSTEM FOR CONFIGURING A RADIO INTERFACE IN A COMMUNICATION SYSTEM

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a method and base station system for configuring a radio interface between a mobile station and a base station in a time-division multiplex mobile radio system for packet data transmission.

Description of the Prior Art--.

On amended sheet 1, line 31, cancel "are".

On page 2, line 4, cancel the ",".

On page 2, line 8, cancel the ",".

On page 2, line 24, cancel the ",".

On page 2, line 28, cancel "are" and substitute therefor --is--.

On amended sheet 3, line 7, cancel "In" and substitute therefor --As a--.

On amended sheet 3, line 7, insert --present-- before "invention".

On amended sheet 3, line 10, cancel "This object is achieved by the ".

On amended sheet 3, cancel lines 11-14.

On amended sheet 3, before line 15, insert the following centered heading:

--**SUMMARY OF THE INVENTION**--.

On amended sheet 3, line 15, insert --present-- before "invention".

On amended sheet 3, line 24, cancel the ",".

On amended sheet 3, line 28, cancel "configuration of" and substitute therefor --configuring--.

On amended sheet 3, line 30, cancel "are" and substitute therefor --is--.

On amended sheet 3, lines 37-38, cancel "saves a" and substitute therefor --it is possible to save,--.

On page 4, line 5, cancel "The" and substitute therefor --In this case, the--.

On page 4, line 6, cancel "in this case".

On page 4, lines 8-9, cancel ", in this case advantageously being" and substitute therefor --wherein it is--.

On page 4, line 9, cancel "being".

On page 4, line 10, cancel ", or" and substitute therefor --. Or, it may be transmitted--.

On page 4, line 20, cancel "are and substitute therefor --is--.

On page 4, line 27, insert a --present-- before "invention".

On page 4, line 30, cancel the ",".

On page 5, line 9, cancel the ",".

On page 5, line 9, cancel "refinement" and substitute therefor --embodiment--.

On page 5, line 10, insert --present-- before "invention".

On page 5, line 30, insert --the uplink and downlink" before "transmission".

On page 5, lines 30-31, cancel ", that is to say in the uplink direction and the downlink direction,".

On page 5, line 32, cancel "In consequence" and substitute therefor --As such--.

On page 5, line 33, insert --it-- after "or".

On page 5, line 35, insert --also-- after "directions".

On page 5, line 35, cancel "also".

On page 6, line 1, cancel "also".

On page 6, line 3, cancel "advantageous refinement" and substitute therefor --embodiment--.

On page 6, line 13, cancel the ",".

On page 6, line 21, cancel ", which" and substitute therefor --. This--.

On page 6, line 22, cancel "bet" and substitute therefor --be--.

On page 6, line 26, cancel the ",".

On page 6, line 35, cancel ", which" and substitute therefor --. This--.

On page 6, line 35, cancel "also".

On page 7, line 5, insert --also-- after "process".

On page 7, line 5, cancel "also".

On page 7, line 10, insert --the-- before "appropriate".

On page 7, line 14, cancel the ",".

On page 7, line 24, cancel the "," after "data".

On page 7, line 27, insert --made-- before "available".

On page 7, line 34, cancel ", as" and substitute therefor --. As--.

On page 7, line 34, cancel "of which" and substitute therefor a --,--.

On page 8, line 3, cancel "advantageous development" and substitute therefor --embodiment--.

On page 8, line 4, insert --present-- before "invention".

On page 8, line 11, cancel the "," and substitute therefor a --;--.

On page 8, line 14, insert a --,-- after "towards the base station".

On page 8, line 23, cancel "can".

On page 8, line 23, insert --can-- before "be".

On page 8, cancel lines 24-26 and substitute the following therefor:

--Additional features and advantages of the present invention are described in, and will be apparent from, the Detailed Description of the Preferred Embodiments and the Drawing.

DESCRIPTION OF THE DRAWING--

On page 8, line 29, cancel the "," and substitute therefor a --;--.

On page 8, line 31, cancel the "," and substitute therefor a --;--.

On page 9, line 2, cancel the "," and substitute therefor a --;--.

On page 9, before line 3, insert the following paragraph:

--FIG. 4 shows the use of time slots for signaling (Tables 1, 2 and 3); and--.

On page 9, line 3, cancel "4" and substitute therefor --5--.

On page 9, line 4, cancel ", and" and substitute therefor a --.--.

On page 9, cancel lines 5-6.

On page 9, before line 7, insert the following centered heading:

--**DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS**--

On page 9, line 9, cancel the ",".

On page 9, line 16, cancel "centre" and substitute therefor --center--.

On page 9, line 18, cancel "centre," and substitute therefor --center--.

On page 9, line 19, cancel "centre" and substitute therefor --center--.

On page 9, line 21, cancel "centre" and substitute therefor --center--.

On page 9, line 27, cancel the ",".

On page 9, line 34, cancel the ",".

On page 9, line 34, insert a --,-- after "and".

On page 9, line 34, insert a --,-- after "thus".

On page 10, line 5, cancel the "," and substitute therefor --wherein--.

On page 10, line 7, cancel "belonging" and substitute therefor --belongs--.

On page 10, line 7, cancel "From hereon" and substitute therefor --Hereafter--.

On page 10, line 12, cancel "then".

On page 10, line 13, insert a --,-- after "terminology".

On page 10, line 24, insert --also-- before "is".

On page 10, line 24, cancel "also".

On page 11, line 3, cancel "Tables 1 and 2" and substitute therefor --Fig. 4--.

On page 11, line 5, insert a --,-- after "are".

On page 11, line 5, insert a --,-- after "case".

On page 11, line 8, cancel the ",".

On page 11, line 8, cancel "comprises" and substitute therefor --includes--.

On page 11, line 10, insert a --,-- after "macroframes".

On page 11, line 10, insert a --,-- after "turn".

On page 11, line 15, insert --both-- before "the".

On page 11, line 21, cancel the "," and substitute therefor --wherein--

On page 11, line 22, insert --is-- before "always".

On page 11, line 22, cancel "being".

On page 11, line 25, cancel ", indicator" and substitute therefor --. Indicator--.

On page 12, line 2, insert --also-- before "may".

On page 12, line 2, cancel "also".

On page 12, line 2, cancel the "," and substitute therefor a --;--.

On page 12, line 13, insert --Fig. 4, -- before "Table 1".

On page 12, line 13, cancel the "-" and substitute therefor --as shown in--.

On page 12, line 14, cancel the "-" and substitute therefor a --,--.

On page 12, line 19, cancel the "," and substitute therefor a --;--.

On page 12, line 19, insert a --,-- after "example".

On page 12, line 21, insert --present-- before "invention".

On page 12, line 33, insert a --,-- after "example".

On page 13, line 22, cancel the ",".

On page 14, line 11, cancel ", in which" and substitute therefor --. In such time slot A--.

On page 14, line 16, insert --either-- after "available".

On page 14, line 18, cancel "else".

On page 14, line 25, insert --also-- after "values".

On page 14, line 25, cancel "also".

On page 14, line 28, cancel "also".

On page 14, line 30, insert --also-- before "can".

On page 14, line 30, cancel "also".

On page 14, lines 33-34, cancel "that is to say" and substitute therefor --. That is, they are matched--.

On page 15, line 18, cancel ", pb" and substitute therefor --also--.

On page 15, line 18, cancel "also".

On page 15, line 26, cancel "comprises" and substitute therefor --includes--.

On page 15, line 35, cancel "FIG. 4" and substitute therefor --FIG. 5--.

On page 16, line 4, insert --which-- before "has had".

On page 16, line 5, insert --which-- before "has".

On page 16, line 9, cancel "subtraction of" and substitute therefor --subtracting--.

On page 16, line 26, cancel the "," after "either".

On page 16, include the following in the paragraph which ends on line 34:

--Indeed, although the present invention has been described with reference to specific embodiments, those of skill in the art will recognize that changes may be made thereto without departing from the spirit and scope of the invention as set forth in the hereafter appended claims.--

On page 22 (last page), cancel line 1 and substitute therefor the following centered heading:

--**ABSTRACT OF THE DISCLOSURE**--

On page 22, line 2, cancel "Method" and substitute therefor --A method--.

On page 22, line 2, cancel "base station".

On page 22, line 2, cancel "configuration of" and substitute therefor --configuring--.

On page 22, line 5, insert --, wherein time slots-- after "transmission".

On page 22, cancel lines 6-7.

On page 22, include the paragraph beginning which begins on line 6 in the paragraph which ends on line 5.

On page 22, line 8, cancel "a" and substitute therefor --the--.

On page 22, line 10, cancel "independently" and substitute therefor --independent--.

On page 22, line 12, insert --also-- before "can".

On page 22, line 12, cancel "also".

On page 22, cancel line 17.

In the Claims:

On page 17, cancel line 1 and substitute therefor:

--**We Claim As Our Invention**--.

Please cancel claims 1-17, without prejudice, and substitute the following claims therefor:

18. A method for configuring a radio interface between a mobile station and a base station of a time-division multiplex mobile radio system for packet data transmission, the method comprising the steps of:

defining a transmission from a mobile station to the base station as an uplink direction;

defining a transmission from the base station to a mobile station as a downlink direction;

forming a channel by at least one time slot per a time-division multiplex frame, wherein the packet data transmission from a plurality of mobile stations takes place via the channel;

combining 52 frames to form a macroframe;

providing a time slot for signaling at cyclic intervals in the channel; and

allocating, by the base station, just one time slot for signaling for the uplink direction to the mobile station in accordance with a sequence which can be predetermined even if the mobile station does not transmit any

packet data for the duration of a current and next macroframe, wherein the mobile station may transmit in the allocated time slot for signaling.

19. A method for configuring a radio interface between a mobile station and a base station as claimed in claim 18, further comprising the steps of:

determining a timing advance for the respective mobile station from transmissions by the mobile station in the allocated time slot; and

transmitting the timing advance in a time slot for signaling in the downlink direction to the corresponding mobile station.

20. A method for configuring a radio interface between a mobile station and a base station as claimed in claim 18, further comprising the step of:

defining the timing advance and values for a transmission power setting independently of one another.

21. A method for configuring a radio interface between a mobile station and a base station as claimed in claim 20, further comprising the step of:

defining, additionally, the timing advance and the values for the transmission power setting from the time slots for packet data transmission.

22. A method for configuring a radio interface between a mobile station and a base station as claimed in claim 18, further comprising the step of:

using longer transmission block types for specific configuration data in the time slots for signaling in the uplink direction.

23. A method for configuring a radio interface between a mobile station and a base station as claimed in claim 18, further comprising the step of:

transmitting configuration data defined in the downlink direction in time slots for packet data transmission.

24. A method for configuring a radio interface between a mobile station and a base station as claimed in claim 18, further comprising the step of:

providing, by the base station, the timing advance for the configuration of the radio interface without being controlled by a base station controller.

25. A method for configuring a radio interface between a mobile station and a base station as claimed in claim 18, further comprising the step of:

combining a plurality of time slots for signaling to form a signaling block.

26. A method for configuring a radio interface between a mobile station and a base station as claimed in claim 25, further comprising the step of:

combining the time slots for signaling in accordance with a sequence which can be predetermined, wherein remaining time slots are provided for an adjacent cell measurement of the mobile station.

27. A method for configuring a radio interface between a mobile station and a base station as claimed in claim 18, further comprising the step of:

providing information in time slots for signaling with additional coding.

28. A method for configuring a radio interface between a mobile station and a base station as claimed in claim 18, further comprising the step of:

enabling the packet data transmission to take place in both the uplink and downlink directions independently of one another.

29. A method for configuring a radio interface between a mobile station and a base station as claimed in claim 18, further comprising the steps of:

designating, additionally, the mobile stations for packet data transmission by abbreviated identifiers; and

allocating, via the time slots for signaling in the downlink direction, one or more time slots for signaling in the uplink direction to the mobile stations by means of indicator messages which contain abbreviated identifiers and time slot designations.

30. A method for configuring a radio interface between a mobile station and a base station as claimed in claim 18, further comprising the step of:

transmitting, by a mobile station per time slot for signaling in the uplink direction, a self-contained message which contains a reception level of the mobile station.

31. A method for configuring a radio interface between a mobile station and a base station as claimed in claim 18, further comprising the step of:

providing transmissions, from the mobile station in the time slots for signaling allocated to it, access blocks having an extended preceding or subsequent guard time, whose transmission time results from a preceding transmission time, a signaled timing advance and an offset value.

32. A method for configuring a radio interface between a mobile station and a base station as claimed in claim 31, further comprising the step of:

choosing the offset value such that a range which corresponds to the offset value is greater than the distance which the mobile station can travel between two transmissions for timing advance definitions at a maximum permissible speed.

33. A base station system for configuring a radio interface between a mobile station and a base station of a time-division multiplex mobile radio system for packet data transmission, comprising:

a base station;

a plurality of mobile stations, wherein a transmission from a mobile station to the base station is defined as an uplink direction and a transmission from the base station to a mobile station is defined as a downlink direction;

a channel formed by at least one time slot per time-division multiplex frame, wherein the packet data transmission from the plurality of mobile stations takes place via the channel;

a macroframe formed from a combination of 52 frames;

a time slot for signaling provided at cyclic intervals in the channel; and

a control device for allocating time slots to the plurality of mobile stations, wherein just one time slot for signaling for the uplink direction is

allocated to the mobile station after a sequence which can be predetermined, and wherein the allocation is independent of any packet data transmission such that the mobile station transmits in the time slot allocated for signaling even if the mobile station does not transmit any packet data for the duration of a current and next macroframe.

34. A base station system for configuring a radio interface between a mobile station and a base station as claimed in claim 33, wherein timing advances for the mobile stations are transmitted, as configuration data for the plurality of mobile stations, in a time slot for signaling in the downlink direction.

REMARKS

The present amendment makes editorial changes and corrects typographical errors in the specification in order to conform the specification to the requirements of the United States Patent practice. No new matter is added thereby. Original claims 1-17 have been canceled in favor of new claims 18-34. However, claims 18-34 have been presented solely because the revisions by bracketing and underlining which would have been necessary in claims 1-17 in order to conform those claims to the requirements of United States Patent practice would have been too extensive, and thus would have been too burdensome. The cancellation of claims 1-17 does not constitute an intent on the part of the Applicants to surrender any of the subject matter of claims 1-17.

Early consideration on the merits is respectfully requested.

Respectfully submitted,

________________________________ (Reg.No. 39,056)
William E. Vaughan
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Chicago, Illinois 60606
(312) 876-0200
Attorneys for Applicants

Description

Method and base station system for configuration of a radio interface between a mobile station and a base station in a time-division multiplex mobile radio system for packet data transmission

Connection-oriented concepts and concepts based on logic links may be used to transmit data between two communications terminals. In the case of connection-oriented data transmissions, physical resources must be provided between the two communications terminals throughout the entire time for data transmission.

Permanent provision of physical resources is unnecessary for data transmission via logical links. One example of such data transmission is packet data transmission. In this case, a logic link exists between the two communications terminals throughout the entire duration of data transmission, but physical resources are provided only during the actual transmission times for the data packets. This method is based on the fact that the data are transmitted in short data packets, between which relatively long pauses may occur. In the pauses between the data packets, the physical resources are available for other logic links. A logic link results in a saving of physical resources.

The packet data transmission method known from DE 44 02 903 A1 and EP 0 681 406 A1 can be used in particular for communications systems with limited physical resources. For example, in mobile radio systems such as the GSM mobile radio system (Global System for Mobile Communications), the physical resources in the frequency band - [lacuna] are [lacuna]

number of frequency channels and time slot - are limited and must be used economically.

The GSM mobile radio system is one example of a time-division multiplex mobile radio system, in which time slots within a frequency channel can be split between different communications terminals. The radio station at the network end of a mobile radio network is a base station, which communicates with mobile stations via a radio interface. Transmission from a mobile station to the base station is called the uplink direction and transmission from the base station to a mobile station is called the downlink direction. A channel, which is reserved for packet data transmission, is formed by at least one time slot per time-division multiplex frame. Furthermore, the channel is defined by the carrier frequency and any frequency jump sequence.

The GSM mobile radio system was originally conceived for voice transmission, and one channel was reserved for continuous information transmission between the mobile station and the base station. However, for packet data transmission, a common channel is used for packet data transmission for a plurality of mobile stations. In addition to the packet data, signalling information is also transmitted, for which a time slot is provided at cyclic intervals within the channel.

The distinction between logic links and physical connections also means that, although a logic link exists for a mobile station, no packet data are transmitted over a certain time interval. However, as long as there is no transmission from the mobile station to the base station, it is impossible for the base station to carry out any measurements relating to the transmission conditions from the mobile station. Previously calculated values lose their validity and must be redefined during renewed allocation of physical channels, or the base station must ensure that the

Article 34

transmission conditions are set in such a manner that reliable transmission is possible in every case. The latter leads, for example, to an excessive, or even maximum, transmission power setting. DE 195 34 156 C1 discloses the determination of the timing advance being suppressed in the absence of specific decision criteria.

In consequence, the invention is based on the object of specifying a method at a base station system for improved configuration of a radio interface for packet data transmission. This object is achieved by the method having the features of Patent Claim 1, and by the base station system having the features of Patent Claim 16. Advantageous developments of the invention can be found in the dependent claims.

According to the invention, time slots for signalling for the uplink direction are allocated to the mobile stations in accordance with a sequence which can be predetermined. The allocation is independent of packet data transmission from or to the mobile station. As a result of this fixed allocation of a time slot for signalling even to mobile stations to which no physical channel is currently allocated, the base station can carry out continuous measurements with regard to the radio interface, in order to define a timing advance. When packet data transmission resumes, immediately valid measurements are therefore available for configuration of the radio interface.

In an alternative method for configuration of the radio interface, configuration data relating to the radio interface for a plurality of mobile stations are combined and transmitted in one time slot for signalling. Such signalling is important for the downlink direction since it contains information relating to the configuration of the radio interface for the mobile station and/or values for the transmission power setting and the timing advance for the transmission time. Since only a small number of details are required per mobile station, [lacuna] saves a [lacuna]

through the combination of configuration data in a message, transmission capacity which is now available for adjacent cell measurements or other signalling information.

The configuration data for a mobile station can in this case be transmitted together with the configuration data for other mobile stations in a single time slot for signalling in the downlink direction, in this case advantageously being repeated or being provided with a coding or error detection, or in a plurality of non-successive time slots for signalling being transmitted. In the latter case, the interleaving provides error protection. It is possible to set the time slots which are combined to form such a signalling block. In the case of such use, for example, of every other time slot for signalling, the time slots in between can be used for adjacent cell measurements.

The proportion of time slots for adjacent cell measurements can be further increased if less configuration data are transmitted (for example only the timing advance) or only a small number of mobile stations need to be supplied. In this case, cyclic adaptation of the combination sequence may be provided. Such adaptation improves the matching of the signalling complexity to the actual requirements of the mobile stations for packet data transmissions.

According to the invention, a closed control loop for the timing advance can be achieved since time slots for signalling are allocated to mobile stations in the uplink direction, and signalling blocks for the mobile stations arrive, with a short time delay, in the downlink direction. Advantageously, only the mobile station and the base station are involved in this control loop. Since, in contrast to packet data transmission, no specific arrangement is required between

a mobile station and a data block for this signalling (this is normally carried out in a base station controller), the base station can set the timing advance on its own. In this case, there is no signalling complexity between the base station and the base station controller.

The configuration of the timing advance and the transmission power setting are carried out independently of one another, according to a further refinement of the invention. The timing advance is defined by a closed control loop between the mobile station and the base station, it being possible to provide a longer cycle between two definitions by suitable selection of the time slots for signalling. Since the motion of the mobile station is relatively slow in comparison with the signal propagation speed, the timing advance need be defined only at intervals of several seconds.

In the process of defining the transmission power setting for the base station, the transmission power is advantageously matched to the mobile station having the poorest transmission conditions on the common channel. To this end, open or closed control loops can be set up independently of the definition of the timing advance. If there are major differences between the transmission powers required for the individual mobile stations and if a plurality of common channels are available, it is advantageous to allocate the mobile stations to the channels on the basis of the transmission power required.

Packet data transmission is advantageously carried out in both transmission directions, that is to say in the uplink direction and the downlink direc-tion, independently of one another. In consequence, a mobile station can transmit data in the uplink direction, or can receive data from the network in the downlink direction. Packet data transmission in both directions can also be provided for a mobile station. The separation into the uplink and downlink directions allows great flexibility in the use of the

radio resources and, of course, also in the design of the mobile stations, which possibly only transmit or receive.

According to a further advantageous refinement, in addition to the designations within the mobile radio system for packet data transmission, the mobile stations are designated by abbreviated identifiers. One or more time slots for signalling in the uplink direction are allocated, via the time slots for signalling in the downlink direction, to the mobile stations by means of indicator messages containing abbreviated identifiers and time slot designations. The abbreviated identifiers allow improved resource utilization between the network and the mobile stations via the radio interface, since they are independent of addresses, that are known in the network, for the mobile stations.

A self-contained message is advantageously transmitted to the base station from a mobile station within a time slot for signalling. This self-contained message contains, for example, received values (RXLEV, RXQUAL) from the mobile station for signals from the base station, which makes it possible for the base station transmission power to bet set immediately for packet data transmission in the downlink direction. Since one closed message is transmitted per time slot, this reduces the time required before the mobile station reception level is available at the base station, and reduces the time for configuration of the radio interface. The base station uses transmissions for signalling in the uplink direction to define the timing advance and the reception level at the base stations with regard to the respective mobile station.

The value and control value, or values and control values, defined for the timing advance and the transmission power are transmitted to the mobile station in the downlink direction, which then also allows it to make the necessary settings for configuration of the radio interface.

The configuration process is further speeded up if the definition of the timing advance and/or of the reception level of the base station is also carried out from the time slots for packet data transmission. The setting time for the configuration process can also be influenced by the allocation of abbreviated identifiers to mobile stations. If, for example, a plurality of abbreviated identifiers are allocated to one mobile station, the setting time is shortened. It is likewise possible to keep the delay times short by appropriate choice of specific abbreviated identifiers at the end of a macroframe. Limiting the number of abbreviated identifiers also leads to a capability to reuse a time slot for signalling for a mobile station more quickly, and to a shortening of the delay time. The number of abbreviated identifiers is advantageously set to correspond to the transmission conditions and to the number of mobile stations provided for the packet data service.

If a plurality of time slots for signalling in the downlink direction are combined to form a signalling block, then the signalling advantageously takes place simultaneously for a plurality of mobile stations. However, the signalling in the downlink direction can likewise take place within packet data, so that, for example, the transmission power setting can be adapted continuously, without using time slots for signalling, and additional time slots are available for adjacent cell measurement.

The choice of specific transmission block types also allows the signalling complexity to be reduced. If normal transmission blocks (normal bursts) are used, in contrast to so-called access levels, it is possible to define the reception power by averaging over a relatively large number of bits, as a result of which the measurement accuracy rises and a smaller number of repeated measurements is required for transmission power setting. Such relatively long transmission blocks are advantageously used for

transmission power setting when timing advance values that are already valid are available.

According to an advantageous development of the invention, access blocks having extended preceding and/or subsequent guard time are provided, in the transmissions from the mobile station, in the time slots allocated to it for signalling. The transmission time of the access block is obtained from a preceding transmission time, a signalled timing advance and an offset value. In addition to the defined timing advances, the offset value is taken into account, this being a positive value which ensures that unique transmission times are set with a minimal signalling complexity if the mobile station is moving away from the base station or towards the base station. The offset value must not result in any negative timing advances being transmitted.

The offset value is advantageously chosen such that the range which corresponds to it is greater than the distance which the mobile station can travel between two transmissions for timing advance definition at the maximum permissible speed. This ensures that, even if the mobile station is travelling at maximum speed, the transmission time can immediately be set reliably.

The invention will be explained in more detail in the following text with reference to exemplary embodiments and using drawing illustrations, in which:

FIG 1 shows a block diagram of a time-division multiplex mobile radio system for packet data transmission,

FIG 2 shows a time-division multiplex frequency channel,

FIG 3 shows the time slots in a channel for packet data transmission,

FIG 4 shows the setting of the timing advance for an access block in the uplink direction, and

Table 1, 2 and 3 show the use of time slots for signalling.

The time-division multiplex mobile radio system according to FIG 1 is, for example, a GSM mobile radio network GSM, which contains at least one base station system BSS with a control device BSC and base station BS. Mobile stations MS are located in the radio zone of an illustrated base station BS. The base station system BSS provides the link to other devices in the GSM mobile radio network GSM.

These other devices are, for example, a mobile switching centre MSC and a unit for providing interworking functions IWF. The interaction of the mobile switching centre MSC and interworking functions IWF results in a packet switching centre, which is also called a GSN (GPRS support node). This packet switching centre is connected to an MSC for voice switching or, alternatively, it could be implemented as a remote, dedicated unit.

The GSM mobile radio network GSM can be connected to other communications networks. For example, another communications terminal KEG can be connected to the GSM mobile radio network, or may itself be part of this GSM mobile radio network GSM.

The GSM mobile radio network GSM is intended to be used for packet data transmission in parallel with the known voice transmission. In this case, the device for providing interworking functions IWF can provide the coupling of the GSM mobile radio network GSM to data transmission networks, and thus to the other communications terminal KEG.

The radio interface between the mobile stations MS and a base station BS is characterized by a frequency and at least one time slot ts. According to Fig. 2, for example, eight time slots ts (ts0 to ts7) are combined to form a frame R. The frame R is repeated cyclically, a recurring time slot, for example the time slot ts = ts4, belonging to one channel. From hereon, this time slot ts is used as the channel GPRS-K for packet data transmission for the purposes of the GPRS (General Packet Radio Services) service.

If a mobile station MS wishes to use this service, it then carries out a random access in accordance with the GSM terminology using a short so-called access burst, and changes to a dedicated control channel. This is followed by authentication and setting of the context with regard to a logic link (standby state). If the other communications terminal KEG wishes to communicate with a mobile station MS via the packet data service, paging and the described random access are carried out at the network end.

For the situation in which the mobile station MS wishes to transmit or receive data packets (ready state), a further random access takes place if a logic link exists. In this case, the mobile station MS is also allocated an abbreviated identifier id and the corresponding GPRS channel GPRS-K. The timing advance ta and the reception level pb in the base station BS are then defined at the network end. At this point, the mobile station MS is assigned four successive time slots T as a packet data block TCH in the uplink direction. If required, details relating to transmission power monitoring are also transmitted.

The packet data transmission and the associated signalling will now be described with reference to FIG 3 and Tables 1 and 2.

Four time slots T for packet data transmission are in each case combined to form a packet data block TCH. Three such packet data blocks TCH and one time slot A, I for signalling are repeated four times to form a macroframe, which comprises 52 frames R. This applies to both the uplink direction and the downlink direction. Furthermore, two such macroframes in turn form a higher-order frame. One macroframe has a duration of 240 ms.

The information in a packet data block TCH is interlinked with four time slots T. The allocation of packet data blocks TCH to different mobile stations MS is carried out in a flexible manner, in the uplink and downlink directions, to one or more mobile stations MS. This allows different data rates to be used. Decisions relating to access to the GPRS channel between the mobile stations MS can be made on the basis of priority allocations. The uplink direction and the downlink direction are considered separately in the following text, a mobile station MS always being able to communicate in both directions. The allocation of packet data blocks TCH while a logic link exists is carried out in band, that is to say, within the packet data blocks TCH, indicator messages are used to indicate to the mobile stations MS who may use the following packet data blocks TCH.

In the downlink direction, not only are four successive time slots T for packet data transmissions interleaved, but the signalling information which forms a signalling block GACCH is also interleaved. In this case, according to Fig. 3, every other time slot A for signalling is combined to form the signalling block GACCH, while the intermediate time slots I are used for measurements relating to mobile stations MS in adjacent cells.

The time slots A, I for signalling and adjacent channel measurement may also be in a different sequence, for example, A/I = 1/3. The base station BS switches between the sequences on the basis of the transmission conditions.

The adjacent cell measurements are used to determine which base stations BS can be selected in the event of a deterioration in the transmission conditions on the currently allocated channel. The mobile station contains a priority list based on these measurements.

A signalling block GACCH in this case contains information for a plurality of mobile stations MS, see Table 1 and Table 2 in this context. Alternatively, - Table 3 - it is possible to reduce the number of time slots per signalling block GACCH and, in addition to or as an alternative to interleaving, to transmit the configuration data (timing advance TA and/or transmission power setting PC) more than once in a time slot and/or to provide it with further protection, for example by coding.

The method according to the invention is particularly advantageous if the timing advance is defined only once and is signalled as indicated below. The transmission power determination is carried out independently of this. Such separation of the determination of the two configuration data items TA, PC provides greater flexibility for the configuration of the radio interface. However, for simplicity, the following text assumes that an identical control loop is used for defining the timing advance TA and the transmission power setting PC.

For example, the GACCH block contains the values for the timing advance TA and the transmission power setting PC (for example the reception level pb of the base station BS or the required transmission power) for the mobile stations 1 to 4. In this case,

the time period before the timing advance TA and the transmission power values PC are repeated is thus 480 ms. If signalling takes place for only two mobile stations, for example two mobile stations which are transmitting in the uplink direction, the number of abbreviated identifiers id can be reduced to two, and the delay time is now 240 ms.

In the uplink direction, the time slots A for signalling are allocated as follows. According to Table 1, the time slots A0 to A1 are allocated for the mobile stations 1 to 2 in the uplink direction (abbreviated identifiers id 0 to 1), and the time slots A2 to A3 are allocated for the mobile stations MS 2 to MS 3 in the downlink direction (abbreviated identifiers id 2 to id3). If the mobile stations MS are communicating in both the uplink and downlink directions, then the time slots A for signalling are allocated in accordance with Table 2.

If the allocation is carried out according to Table 1, that is to say the uplink direction and downlink direction are considered separately, each mobile station MS transmits a specially coded access burst to the base station BS, in the time slot A allocated to it for signalling. In this process, it signals the field strength and quality (RXLEV, RXQUAL) with which the signalling blocks GACCH from the base station BS have been received in the downlink direction. The base station BS measures the transmissions (time slots A allocated for signalling) from the mobile station MS in order to define a timing advance TA and a transmission power, or the transmission power change PC for the mobile station MS, and signals this to the mobile station MS. The mobile station MS thus receives values which it uses when packet data blocks TCH are transmitted in the uplink direction.

The base station BS uses the reception level pm reported by the mobile station MS to set a reasonable transmission power when, subsequently, packet data blocks TCH are transmitted to the mobile station MS for data transmission in the downlink direction. The delay times for the current values of the timing advances

TA and transmission power values in the uplink direction are as follows: The mobile station MS receives new values at an interval of 480 ms. With regard to the sequence of the time slots I, A, it should be noted that the time between signalling in the uplink direction by a mobile station MS and a transmission provided for this mobile station MS in the downlink direction is short.

According to Table 3, the signalling in the downlink direction has been designed such that each mobile station 1 to 4 has been assigned an individual time slot A for signalling, in which the timing advance TA is transmitted with additional error protection. The fewer the number of mobile stations which are using the common channel GPRS-K, the fewer is the number of such time slots A that are required for signalling and the greater is the number of time slots I that are available for adjacent cell measurements, for additional signalling (for example link clearing, frequency changing) or else for additional data transmission.

The exemplary embodiments can be modified such that abbreviated identifiers id are used in such a manner that the abbreviated identifiers id 1 and 3 are used by preference. In this case, the delay times are close to the best case of 240 ms. The interval between the arrival of new values is also reduced if the abbreviated identifiers id are used twice. If the number of abbreviated identifiers is further limited, then the delay time is also shortened. If non-updated values are acceptable for relatively long times, then the number of abbreviated identifiers id can also be increased in steps of four to 8, 12, 16 etc.

The allocation of abbreviated identifiers id is matched, in particular, to the transmission conditions, that is to say to the previously recorded changes in the timing advance TA and transmission power changes. The number of mobile stations

MS which wish to use packet data transmission via the GPRS channel GPRS-K is also taken into account.

As a result of the fixed allocation of time slots A for signalling in the uplink direction, the base station BS is continuously informed of the current transmission conditions for the radio interface, and can configure the radio interface accordingly. A closed control loop exists for mobile stations MS which signal in such a manner in the uplink direction and to which the values for the timing advance TA and for the transmission power setting PC are transmitted in the downlink direction via the signalling blocks GACCH. The control loop is also feasible when the mobile station MS is not currently transmitting or receiving packet data.

However, if the mobile station MS is also allocated packet data blocks TCH in the uplink or downlink directions, values for the timing advance TA or the reception level pb, pb can also be calculated and transmitted for this purpose.

Access radio blocks AB according to FIG 4 are transmitted in the uplink direction. An original timing advance of TAold=30 is assumed. The base station uses the transmissions to define the timing advance TA (for example TA=1 for a mobile station MS which is moving away from the base station BS). The access radio block AB transmitted for signalling in the time slot A comprises a synchronization sequence sync followed by a data section data. The access radio block AB is preceded by a guard time of 8 bits and is followed by a guard time of 3 bits. The radio-frequency transmission stabilizes in the guard times. Furthermore, an offset value off of 3 bits is shown, which influences the setting of the transmission time.

The basic setting of the transmission time of 468.75 bits shown in FIG 4 corresponds to the timeframe offset between the downlink and uplink directions known from the GSM mobile radio system.

The mobile station MS defines a new timing advance TAnew (TAnew=TAold+TA-off) on the basis of a timing advance TA (in the value range from 0 to 64) which has been defined by the base station BS, has had the offset value off applied to it and has been signalled in the downlink direction. The current transmission time for transmitting the next access block AB in the uplink direction is set by taking account of the basic setting and subtraction of the new timing advance TAnew as well as the offset value off.

This avoids any necessity to signal negative timing advances TA, even if the mobile station MS is approaching the base station BS. Errors which occur in the measurement and/or setting of the timing advance TA do not accumulate but are corrected in the following adjustment. As a result of the unique transmission of the timing advance TA, the mobile station MS has available a setting value for the transmission time in the time slot A for signalling and in the time slot T for packet data transmission.

The choice of the offset value off of 3 bits allows the transmission time continuously to be set correctly even at a maximum speed of 500 km/h and with a repetition period of the definition of the timing advance of 4 s. In addition, this value does not unnecessarily shorten the guard time either, so that, if required, an additional radio block can be transmitted in the same time slot A for signalling.

The method according to the invention is particularly suitable for supporting packet-oriented transmission of information via the radio interface for telematics applications, fax and file transmission, point of sales implementations, fleet management and traffic management systems.

Artikel 34

GR 97 P 2855

Patent Claims

1. Method for configuration of a radio interface between a mobile station (MS) and a base station (BS) of a time-division multiplex mobile radio system for packet data transmission, wherein

- the transmission from a mobile station (MS) to the base station (BS) is called the uplink direction, and from the base station (BS) to a mobile station (MS) is called the downlink direction,
- a channel (GPRS-K) is formed by at least one time slot (ts, T, A) per time-division multiplex frame (R), 52 frames (R) being combined to form a macroframe,
- the packet data transmission from a plurality of mobile stations (MS) takes place via the common channel (GPRS-K),
- a time slot (ts, A, I) for signalling is provided at cyclic intervals in the channel (GPRS-K),

characterized in that

just one time slot (ts, A) for signalling for the uplink direction is allocated by the base station (BS) to the mobile station (MS) in accordance with a sequence which can be predetermined, and the mobile station (MS) transmitting in the allocated time slot (ts, A) for signalling, even if the mobile station (MS) does not transmit any packet data for the duration of the current and next macroframe.

2. Method according to Claim 1,

in which the timing advance (TA) for the respective mobile station (MS) is determined from transmissions by the mobile station (MS) in the allocated time slot (ts, A), and

the timing advance (TA) is transmitted in a time slot (ts, A) for signalling in the downlink direction to the corresponding mobile station (MS).

AMENDED SHEET

mobile stations (MS) takes place via the common channel (GPRS-K),

- a time slot (ts, A, I) for signalling is provided at cyclic intervals in the channel (GPRS-K),

in which

the timing advance (TA) for the respective mobile station (MS) is defined by the base station (BS) from transmissions in the time slots (ts, A) for signalling in the uplink direction and

configuration data (TA, PC) for at least one mobile station (MS) are transmitted in a time slot (ts, A) for signalling in the downlink direction.

3. Method according to Claim 1 or 2,

in which the timing advance (TA) and values for the transmission power setting (PC) are defined independently of one another.

4. Method according to Claim 3,

in which the timing advance (TA) and/or the values for the transmission power setting (PC) are additionally defined from the time slots (ts, T) for packet data transmission.

5. Method according to one of the preceding claims, in which longer transmission block types are used for specific configuration data (TA, PC) in the time slots (ts, A) for signalling in the uplink direction.

6. Method according to one of the preceding claims, in which configuration data (PC) defined in the downlink direction are transmitted in time slots (T) for packet data transmission.

7. Method according to one of the preceding claims, in which the timing advance (TA) for the configuration of the radio interface is provided by the base station (BS) without being controlled by a base station controller (BSC).

8. Method according to one of the preceding claims, in which a plurality of time slots (ts, A) for signalling are combined to form a signalling block (GACCH).

9. Method according to Claim 8, in which the time slots (ts, A) for signalling are combined in accordance with a sequence which can be predetermined, remaining time slots (I) being provided for an adjacent cell measurement of the mobile station (MS).

10. Method according to one of the preceding claims, in which information in time slots (ts, A) for signalling is provided with additional coding and/or is included in the time slots (ts, A) more than once.

11. Method according to one of the preceding claims, in which the packet data transmission takes place in both transmission directions independently of one another.

12. Method according to one of the preceding claims, in which the mobile stations (MS) for packet data transmission are additionally designated by abbreviated identifiers (id) and, via the time slots (ts, A) for signalling in the downlink direction, one or more time slots (ts, A) for signalling in the uplink direction are allocated to the mobile stations (MS) by means of indicator messages which contain abbreviated identifiers (id) and time slot designations.

13. Method according to one of the preceding claims, in which a self-contained message, which contains the reception level (pm) of the mobile station (MS), is transmitted by a mobile station (MS) per time slot (ts, A) for signalling in the uplink direction.

14. Method according to one of the preceding claims,

in which transmissions from the mobile station (MS) in the time slots (ts, A) for signalling allocated to it are provided [lacuna] access blocks (AB) having an extended preceding and/or subsequent guard time, whose transmission time results from a preceding transmission time, a signalled timing advance (TA) and an offset value (off).

15. Method according to Claim 14, in which the offset value (off) is chosen such that the range which corresponds to it is greater than the distance which the mobile station (MS) can travel between two transmissions for timing advance definitions at the maximum permissible speed.

16. Base station system (BSS) for configuration of a radio interface between a mobile station (MS) and a base station (BS) of a time-division multiplex mobile radio system for packet data transmission, wherein

- the transmission from a mobile station (MS) to the base station (BS) is called the uplink direction, and from the base station (BS) to a mobile station (MS) is called the downlink direction,
- a channel (GPRS-K) is formed by at least one time slot (ts, T, A) per time-division multiplex frame (R),
- the packet data transmission from a plurality of mobile stations (MS) takes place via the common channel (GPRS-K),
- a time slot (ts, A) for signalling is provided at cyclic intervals in the channel (GPRS-K),

having a control device (BSC) for allocating time slots (ts, A) for signalling to the mobile station (MS) in accordance with a sequence which can be predetermined,

- the allocation being independent of packet data transmission from or to the mobile station (MS), and
- the timing advance (TA) of the respective mobile station (MS) being defined from transmissions in the time slots (ts, A) for signalling in the uplink direction.

Article 34

16. Base station system (BSS) for configuration of a radio interface between a mobile station (MS) and a base station (BS) of a time-division multiplex mobile radio system for packet data transmission, wherein

- the transmission from a mobile station (MS) to the base station (BS) is called the uplink direction, and from the base station (BS) to a mobile station (MS) is called the downlink direction,
- a channel (GPRS-K) is formed by at least one time slot (ts, T, A) per time-division multiplex frame (R), 52 frames (R) being combined to form a macroframe,
- the packet data transmission from a plurality of mobile stations (MS) takes place via the common channel (GPRS-K),
- a time slot (ts, A) for signalling is provided at cyclic intervals in the channel (GPRS-K),

having a control device (BSC) for allocating time slots (ts, A) to the mobile station (MS),

characterized in that

the control device (BSC) is distinguished by the fact that just one time slot (ts, A) for signalling for the uplink direction is allocated to the mobile station (MS) after a sequence which can be predetermined, in which case the allocation is independent of any packet data transmission, so that the mobile station (MS) transmits in the time slot (ts, A) allocated for signalling, even if the mobile station (MS) does not transmit any packet data for the duration of the current and next macroframe.

17. Base station system according to Claim 16, [lacuna] the defined timing advance (TA) are transmitted, as configuration data for a plurality of mobile stations (MS), in a time slot (ts, A) for signalling in the downlink direction.

Abstract

Method and base station system for configuration of a radio interface between a mobile station and a base station in a time-division multiplex mobile radio system for packet data transmission

For signalling for configuration of a radio interface for packet data transmission (GPRS), time slots for signalling are allocated by a base station to the mobile stations in accordance with a sequence which can be predetermined, independently of packet data transmission. The time for configuration of the radio interface can also be reduced by a plurality of time slots for signalling being combined to form a signalling block, or the signalling to a plurality of mobile stations being carried out within one time slot. This signalling is used to define and set the timing advance.

FIG 3

BOX PCT

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UNDER THE PATENT COOPERATION TREATY-CHAPTER II

APPLICANTS: Christian Menzel et al. DOCKET NO: P99,0499

SERIAL NO: GROUP ART UNIT:

EXAMINER:

INTERNATIONAL APPLICATION NO: PCT/DE97/02582

INTERNATIONAL FILING DATE: 06 November 1997

INVENTION: **METHOD AND SYSTEM FOR CONFIGURING A RADIO INTERFACE IN A COMMUNICATION SYSTEM**

Assistant Commissioner for Patents,
Washington, D.C. 20231

SUBMISSION OF DRAWINGS

Applicants herewith submit five sheets (Figs. 1-5) of drawings for the above-referenced PCT application.

Respectfully submitted,

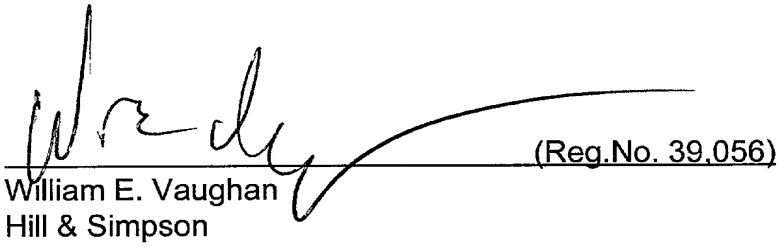

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Fig.1

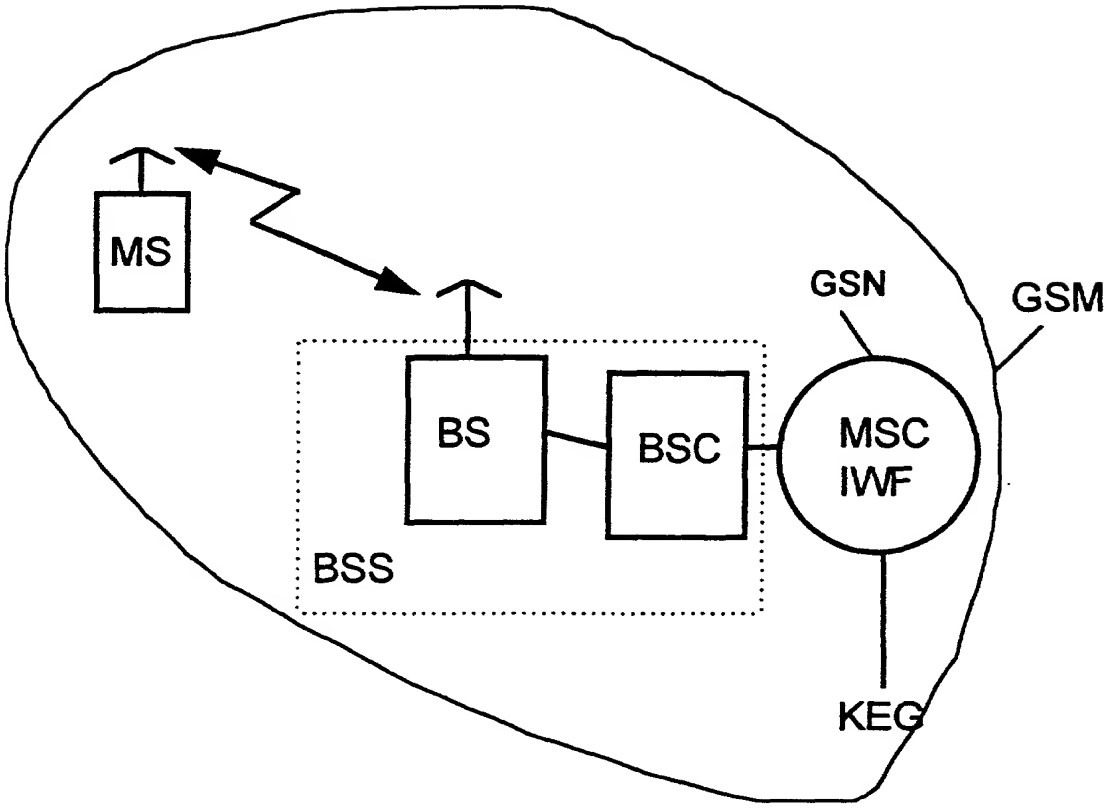
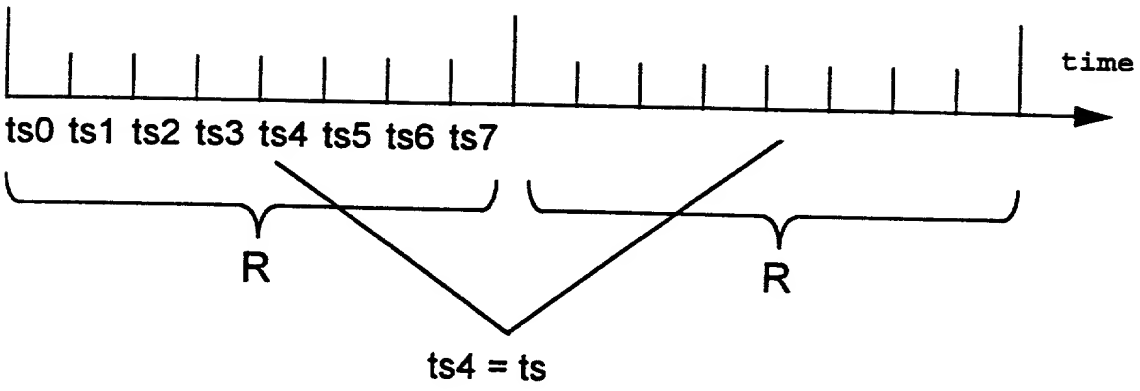


Fig.2



GPRS-K

Fig.3

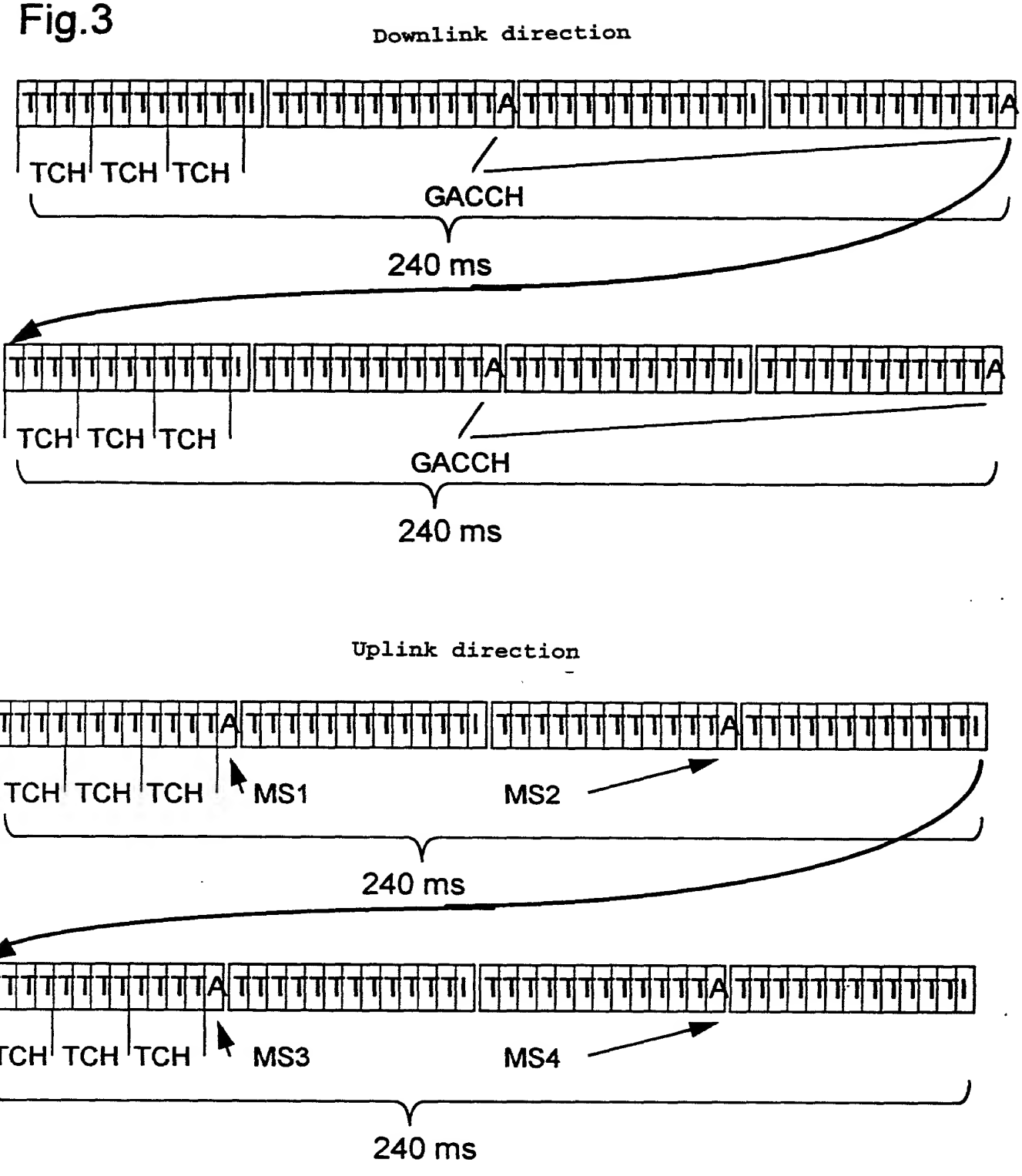

Downlink direction
TCH TCH TCH
A
GACCH
240 ms
TCH TCH TCH
A
GACCH
240 ms
Uplink direction
TCH TCH TCH
A
MS1
MS2
240 ms
TCH TCH TCH
A
MS3
MS4
240 ms

Fig. 4

Table 1

GACCH Burst	Uplink direction	Downlink direction
	Measurements relating	GACCH Block
I	to the adjacent cells	
A0	MS1, id 0 uplink	TA and PC for MS 1 to 4
A1	MS2, id 1 uplink	TA and PC for MS 1 to 4
A2	MS3, id 2 downlink	TA and PC for MS 1 to 4
A3	MS4, id 3 downlink	TA and PC for MS 1 to 4

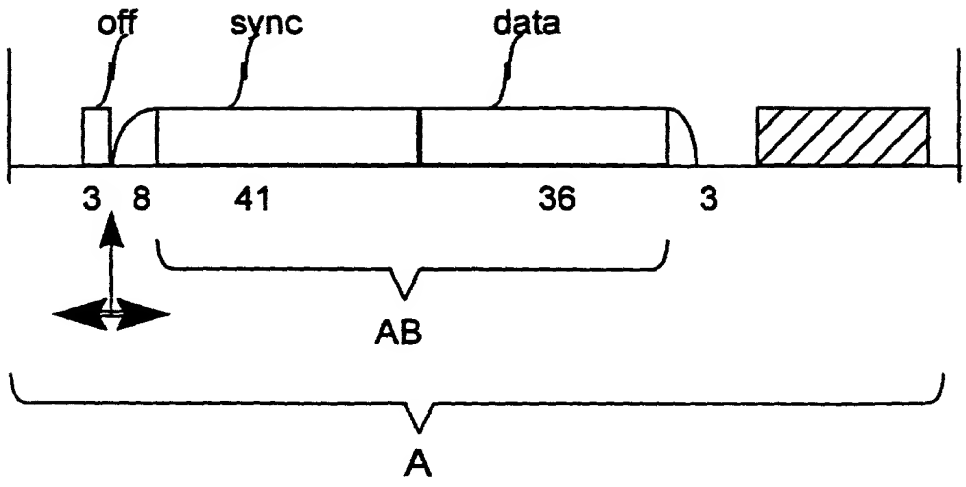
Table 2

GACCH Burst	Uplink direction	Downlink direction
		GACCH Block
A0	MS1, id 0 both directions	TA for MS 1 to 4
A1	MS2, id 1 both directions	TA for MS 1 to 4
A2	MS3, id 2 both directions	TA for MS 1 to 4
A3	MS4, id 3 both directions	TA for MS 1 to 4

Table 3

GACCH Burst	Uplink direction	Downlink direction
		GACCH Block
A0	MS1, id 0 both directions	TA for MS 1
A1	MS2, id 1 both directions	TA for MS 2
A2	MS3, id 2 both directions	TA for MS 3
A3	MS4, id 3 both directions	TA for MS 4

Fig. 5



MS BS

TAold=30, off=3

Transmission time = 468.75-(30+3)=435.75

AB →

TA definition
e.g. TA=1

TA signalling
e.g. TA=4=1+3

← AB

Set transmission time
TAnew=TAold+TA-off
Transmission time = 468.75-(31+3)=434.75

AB →

Declaration and Power of Attorney For Patent Application
Erklärung Für Patentanmeldungen Mit Vollmacht
German Language Declaration

Als nachstehend benannter Erfinder erkläre ich hiermit an Eides Statt:

As a below named inventor, I hereby declare that:

dass mein Wohnsitz, meine Postanschrift, und meine Staatsangehörigkeit den im Nachstehenden nach meinem Namen aufgeführten Angaben entsprechen,

My residence, post office address and citizenship are as stated below next to my name,

dass ich, nach bestem Wissen der ursprüngliche, erste und alleinige Erfinder (falls nachstehend nur ein Name angegeben ist) oder ein ursprünglicher, erster und Miterfinder (falls nachstehend mehrere Namen aufgeführt sind) des Gegenstandes bin, für den dieser Antrag gestellt wird und für den ein Patent beantragt wird für die Erfindung mit dem Titel:

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

Verfahren und Basisstationssystem zur Konfigurierung einer Funkschnittstelle zwischen einer Mobilstation und einer Basisstation eines Zeitmultiplex-Mobilfunksystems für eine Paketdaten-übertragung

deren Beschreibung

the specification of which

(zutreffendes ankreuzen)
☒ hier beigefügt ist.
☐ am _____ als PCT internationale Anmeldung PCT Anmeldungsnummer _____ eingereicht wurde und am _____ abgeändert wurde (falls tatsächlich abgeändert).

(check one)
☐ is attached hereto.
☐ was filed on _____ as PCT international application PCT Application No. _____ and was amended on _____ (if applicable)

Ich bestätige hiermit, dass ich den Inhalt der obigen Patentanmeldung einschliesslich der Ansprüche durchgesehen und verstanden habe, die eventuell durch einen Zusatzantrag wie oben erwähnt abgeändert wurde.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims as amended by any amendment referred to above.

Ich erkenne meine Pflicht zur Offenbarung irgendwelcher Informationen, die für die Prüfung der vorliegenden Anmeldung in Einklang mit Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) von Wichtigkeit sind, an.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

Ich beanspruche hiermit ausländische Prioritätsvorteile gemäss Abschnitt 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 119 aller unten angegebenen Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde, und habe auch alle Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde nachstehend gekennzeichnet, die ein Anmeldedatum haben, das vor dem Anmeldedatum der Anmeldung liegt, für die Priorität beansprucht wird.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

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Prior foreign appplications
Priorität beansprucht

			Priority Claimed	
196 47 629.1	Germany	18. November 1996	☒	☐
(Number) (Nummer)	(Country) (Land)	(Day Month Year Filed) (Tag Monat Jahr eingereicht)	Yes Ja	No Nein
196 52 303.6	Germany	16. Dezember 1996	☒	☐
(Number) (Nummer)	(Country) (Land)	(Day Month Year Filed) (Tag Monat Jahr eingereicht)	Yes Ja	No Nein
			☐	☐
(Number) (Nummer)	(Country) (Land)	(Day Month Year Filed) (Tag Monat Jahr eingereicht)	Yes Ja	No Nein

Ich beanspruche hiermit gemäss Absatz 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 120, den Vorzug aller unten aufgeführten Anmeldungen und falls der Gegenstand aus jedem Anspruch dieser Anmeldung nicht in einer früheren amerikanischen Patentanmeldung laut dem ersten Paragraphen des Absatzes 35 der Zivilprozeßordnung der Vereinigten Staaten, Paragraph 122 offenbart ist, erkenne ich gemäss Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) meine Pflicht zur Offenbarung von Informationen an, die zwischen dem Anmeldedatum der früheren Anmeldung und dem nationalen oder PCT internationalen Anmeldedatum dieser Anmeldung bekannt geworden sind.

I hereby claim the benefit under Title 35. United States Code. §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §122, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occured between the filing date of the prior application and the national or PCT international filing date of this application.

(Application Serial No.) (Anmeldeseriennummer)	(Filing Date) (Anmeldedatum)	(Status) (patentiert, anhängig, aufgegeben)	(Status) (patented, pending, abandoned)
(Application Serial No.) (Anmeldeseriennummer)	(Filing Date) (Anmeldedatum)	(Status) (patentiert, anhängig, aufgeben)	(Status) (patented, pending, abandoned)

Ich erkläre hiermit, dass alle von mir in der vorliegenden Erklärung gemachten Angaben nach meinem besten Wissen und Gewissen der vollen Wahrheit entsprechen, und dass ich diese eidesstattliche Erklärung in Kenntnis dessen abgebe, dass wissentlich und vorsätzlich falsche Angaben gemäss Paragraph 1001, Absatz 18 der Zivilprozessordnung der Vereinigten Staaten von Amerika mit Geldstrafe belegt und/oder Gefängnis bestraft werden koennen, und dass derartig wissentlich und vorsätzlich falsche Angaben die Gültigkeit der vorliegenden Patentanmeldung oder eines darauf erteilten Patentes gefährden können.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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VERTRETUNGSVOLLMACHT: Als benannter Erfinder beauftrage ich hiermit den nachstehend benannten Patentanwalt (oder die nachstehend benannten Patentanwälte) und/oder Patent-Agenten mit der Verfolgung der vorliegenden Patentanmeldung sowie mit der Abwicklung aller damit verbundenen Geschäfte vor dem Patent- und Warenzeichenamt: *(Name und Registrationsnummer anführen)*

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. *(list name and registration number)*

And I hereby appoint

Messrs. John D. Simpson (Registration No. 19,842) Lewis T. Steadman (17,074), William C. Stueber (16,453), P. Phillips Connor (19,258), Dennis A. Gross (24,410), Marvin Moody (16,549), Steven H. Noll (28,982), Brett A. Valiquet (27,841), Thomas I. Ross (29,275), Kevin W. Guynn (29,927), Edward A. Lehmann (22,312), James D. Hobart (24,149), Robert M. Barrett (30,142), James Van Santen (16,584), J. Arthur Gross (13,615), Richard J. Schwarz (13,472) and Melvin A. Robinson (31,870), David R. Metzger (32,919), John R. Garrett (27,888) all members of the firm of Hill, Steadman & Simpson, A Professional Corporation.

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(Bitte entsprechende Informationen und Unterschriften im Falle von dritten und weiteren Miterfindern angeben).

(Supply similar information and signature for third and subsequent joint inventors).